Customizing the Customer Experience

Combining the Agility of the Cloud with an Intelligent Network to Create the Service Provider of the Future

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Executive Summary

The network has changed people's lives immeasurably all around the world. It has expanded economies, given voices to the otherwise unheard, and brought people and communities closer together. In this new age, businesses and consumers rely on their service providers more so than ever before.

The service provider has been critical in changing the "new normal" of our lives. However, the resulting data deluge (driven by video, mobility, cloud computing, and the Internet of Things) is accelerating the use of and the demands on the network such that service providers struggle to keep up in terms of user demands and profitability. For years, the focus of many has been on CapEx and OpEx reduction to meet the bottom line.

Juniper Networks' approach to intelligent networking introduces a new vision for service providers:

- Imagine if the network inherently ***masked complexity*** to end users and to operators.
- Imagine if the network could adapt ***on the fly*** to deliver experiences based on user preferences.
- Imagine if intelligent software ***could be added*** to make existing hardware more efficient and versatile.

This new, highly intelligent network empowers end users with the experience they need, adapting and responding in real time and on the fly. It combines physical and virtual elements to turn the network into a rapid service creation platform. It is the only open, multivendor, multilayer, and multidomain solution on the market. And it is "a must" for the service provider who wants to conquer complexity, increase relevance and revenue, and optimize resource utilization.

Introduction

The world has clearly changed. The network is enabling people to address some of the greatest problems of our time—from world health by mapping the human genome, to expanded access to education with Massive Open Online Courses (MOOCs), to equalized economic opportunity via Internet-enabled microlending communities.

Mobile devices keep people connected to their valuable data and applications in the cloud. We can photograph our food before we eat it, and post a review at the table. Or we can see and know exactly where friends and family are based on the location of their smartphones. Even driving home, the network can use real-time traffic information to suggest alternative routes based on time, or distance, or stops on the way.

And the whole ecosystem is expanding—we've moved from subscribers to subscriptions—enabling a growing range of devices to connect to the Internet while both sharing, and learning from vast amounts of data.

The Age of Personalization

We've entered the age of personalization. Consumers and business professionals are demanding customizable, on-demand services. The response is typically a three-step process: It starts with providing a product; then collecting data on who uses it and how; and then using that data to create customized versions of the product for specific individuals or groups.

This has become common practice in many industries. In the hospitality industry, for example, hotels have shifted from providing rooms without understanding the customer, to adding rewards programs to better understand their user base. The next step is a completely personalized experience, where the hotel knows, based on past information, what was used in the mini-bar (and overstocks), or which side of the bed was used (and turns that side down).

In the music world, personal preference has shifted from predefined albums to defining your own playlists to streaming audio that has "learned and adapted" to match your greatest hits list.

In short, it's not enough to know—now companies need to take that knowledge and use it to adapt their product or service to our needs based on historical input.

One Size Does Not Fit All

Today, the choices for network services are relatively limited and inflexible. No two people are alike, and yet many networks use a "one size fits all" strategy. For instance, customization is typically defined on one parameter, with bandwidth, resulting in a handful of predefined connectivity packages available to users.

Yet there are many other dimensions (applications, security, location, time of day, device, content groups/organizations, throughput, etc.) which, combined with truly understanding a subscriber's usage, can be used to create a compelling and more profitable service—one that users are willing to pay for.

According to a recent Bain & Company study, consumers who purchased ***customized*** products from a manufacturer paid an average of ***28 percent more*** than standard products from that same manufacturer.

Consumer Customized Cloud

Basic Internet is free! Get what you want, when you need it, based on your particular preferences and interests. In fact, limited ad-supported, no cost Internet access is already available in some locations.

This "free-mium" model is predicated on upselling value when there is user need. And people use the network for many things depending on the "mode" they are in—business mode, student mode, or just plain you. Why not let the network match your self-definition as it delivers services?

Work Mode

Today, people typically order data/usage in fixed size buckets: 1 MB, 5 MB, 15 MB, etc. The network knows nothing of their personas. If teleworking, premium packages must be ordered and billed to the user. All video is the same whether it's Netflix or business-critical teleconferencing. Added network conditioning (firewall, etc.) are not added on the fly, but laboriously configured and then always left always on.

But tomorrow, your basic free service will be upgraded and streamlined for telework when you connect to your employer. Connecting to the company initiates a billable event (to the company) and the network kicks into high gear. More bandwidth is allocated, teleconferencing and Outlook365 are prioritized, Netflix/Facebook/Xbox are set low, and advanced security services and protection are dropped in.

Student Mode

Similar to above, the student may have a discounted or free basic service, but as a student, participates in a distance learning or Massively Open Online Course (MOOC) offered by the school.

In the future, the access service is upgraded and streamlined for distance learning and billed back to the university offering MOOCs as part of the fee. Video and collaboration are prioritized, Netflix/FB/Xbox are set low, and storage, compute, and video quality are added.

Just Plain You Mode

Today, it can take days to get something as simple as a bandwidth package change that allows real-time expansion and contraction based on needs. And these days, upstream bandwidth is no different, and no less important, than downstream.

But tomorrow, your service will automatically detect and streamline the availability of additional bandwidth on demand as you need it, for high definition video on demand (VOD), low-latency online gaming, or uploading home surveillance content to cloud storage for mobile access. And of course, storage, quality of service (QoS), and assorted virtualized network functions can be added to increase the overall service value as needed.

Business Customized Cloud

The most common offer to business customers today is connectivity. With connectivity comes the opportunity to bring additional value by upselling new services. Yet oftentimes, the service provider's own internal systems and structure inhibit developing and delivering new capabilities.

New services abound, ranging from network layer security, VPN caching, and WAN acceleration, to cloud-based infrastructure and platforms, completely over-the-top communications, and software delivered as a service. Suddenly the value-added extras to the foundational connection are being delivered by the fastest, most nimble competitors.

By 2016, 62% of enterprise workloads will be moved into the cloud, according to Cisco's Visual Networking Index. Service providers remain uniquely positioned to offer the best combination of IP connectivity and IT intelligence to capitalize on this growing trend. For the business customer, the cloud can provide "big IT for the little guy" and a level playing field that is backed by a trusted service provider.

There is an opportunity for service providers to build on the platform they deliver, and partner with best-in-class cloud service providers, to bundle together solutions their customers want and need. Service providers have the ability to be the "one stop shop" for a full suite of IT applications by combining strength in networking, security, and connectivity with the flexibility of cloud services, and also building on their reputation as a trusted supplier.

They don't have to own it all to offer it all. They can layer in network requirements like bandwidth bursting, low latency, integrated security, and monitoring to really make the cloud experience pop. With a high IQ network and Network Functions Virtualization (NFV) technologies, service creation goes from truck rolls to mouse rolls.

The service providers that can meet these new demands and provide this level of customization will have a huge competitive advantage in terms of:

- Increased relevance as they empower users (stickiness/satisfaction)
- Increased revenue as they meet demand (ARPU, value, monetization)
- Increased utilization of current infrastructure investments (lower OpEx, lower CapEx)

In the past, the ability to customize services at will was limited. This is the unfortunate legacy of how networking has evolved. Networks are too rigid to accommodate changes in real time. Any changes have had to be pre-calculated, laboriously engineered, tested months beforehand, and then manually configured into static operations.

In today's complex and dynamic environment, a new approach to the network is needed.

The Network with a High IQ

Juniper Networks introduces a new vision for service provider networks—an adaptable and intelligent network. Today's networks are smarter than they have ever been. There are massive amounts of data being collected, analyzed, and mapped. The network is aware of who is connecting, how they have connected, and what they are doing.

What's been missing is the ability to make any appreciable adjustments in anything close to real time based on all of this intelligence. But what if the network inherently ***masked complexity*** to end users and to operators, it could ***adapt on the fly*** to deliver experiences based on user preferences, and intelligent software could be added to make existing hardware more efficient and versatile?

Juniper's intelligent network architecture empowers end users with the customized experience they need, adapting and responding in real time and on the fly. It combines physical and virtual elements to turn the network into a rapid service creation platform, and it is the only open, multivendor, multilayer, and multidomain solution on the market.

This new network approach is based on three principles that enable the service provider to automate, scale, and create at the pace of cloud providers.

Automate

It's no secret that operational complexity increases with every node, appliance, server, and router. A large network may have tens of core routers, hundreds of edge routers, and tens of thousands of devices for low-level transport, access, and aggregation, not to mention appliance-based network functions throughout the system.

Yet automating network operations is required for simplicity and agility. Reducing and eliminating manual intervention is critical to the service provider's ability to respond to dynamic service needs. Plus, it makes good business sense, driving down operational costs and freeing up investment in services to generate new revenues rather than maintain existing systems.

Juniper provides a range of tools and platforms to enable automation. Juniper Networks® Junos® Space is Juniper's open, programmable management platform. Juniper Networks Contrail is an SDN controller for provisioning and managing application and cloud services. The latest automation tool is Junos Fusion, which enables the centralized control and provisioning of multiple network elements from a single management plane. With Juniper's new Junos Fusion, service providers can collapse thousands of underlying transport elements such as optical and microwave into a single managed control point such as the Juniper Networks MX Series 3D Universal Edge Routers, unifying separate packet and optical layers into a single operational environment.

Leveraging industry standard protocol NETCONF/YANG, a single management interface on a Junos OS router, can also be used to unify management for Juniper and third- party network elements.

Scale

Scalability is critical for the network infrastructure, if service providers are going to deliver the performance and efficiency needed to economically meet demand. Scale can take on many dimensions at many layers within the network, and Juniper focuses on driving performance throughout its silicon, systems, and software. With leadership in high-performance network silicon up to massively scalable SDN technology, Juniper Networks is uniquely suited to meet the demands of a growing and self-defining network.

One new element of scaling and automating the network is Juniper's Northstar Controller, Juniper's traffic engineering (TE) controller. The Northstar Controller uses advanced traffic engineering algorithms from recently acquired WANDL, Inc. to enable dynamic paths through the transport network to increase utilization, remove unnecessary redundancy, dynamically adjust to changing network conditions, and create service-oriented paths through the network to support network services.

As a result, service providers can better support dynamic cloud traffic, avoid costly overprovisioning, reduce wasted CapEx spend, and better scale existing network resources.

Create

Creating value for service providers is predicated on knowing what customers are doing, and being able to adapt quickly. Juniper is bringing to bear a range of technologies to give service providers deep insight into their customers' behaviors, and then combining that with network virtualization to adapt in near real time.

With new traffic detection and steering functions, Juniper is combining the power of knowledge and customer/traffic insight with the ability to steer traffic through unique, policy-based service chains. Rather than one size fits all, service providers can create service offerings that deliver unique and differentiated value to meet individual demands.

No longer will all customers, subscribers, and devices be given the same treatment, nor will they be charged the same amount. The ability to create new service value at the same rate as cloud providers means leveraging similar technology approaches, and the ability to better monetize value.

With Network Functions Virtualization (NFV), service providers can now move/add/change network elements and configurations at the same rate as cloud providers. Hardware-based appliances, and the associated limitations in terms of scale, agility, portability, and management, are all a thing of the past. Virtualization has freed service providers to create more cost-effective computing platforms with NFV.

Juniper has expanded NFV to be flexibly distributed and dynamically used in the network. Network functions can run on high-performing MX Series platforms close to users or consolidated on cost-optimized servers in the cloud. Contrail uses SDN to create the service chains accordingly, and enables the support of Juniper as well as third-party virtualized network functions. This enables the service provider to create any network services, from any vendor, at the most optimum performance and efficient point in the network.

Conclusion

Juniper has a vision for the service provider network of the future. It is a network that enables service creation while optimizing performance. It is a network that is self-defining, intelligent enough to know what's happening, and able to adapt in real time to deliver the optimal customer experience. And it is a network built to automate, scale, and create customer value.

With a high IQ network from Juniper, service providers can meet new levels of demand and provide customization that brings competitive advantage in terms of increased relevance, increased revenue, and increased asset utilization. This new, highly intelligent network paradigm can empower end users with the experience they need, adapting and responding in real time and on the fly. It combines physical and virtual elements to turn the network into a rapid and cost-effective service creation platform. It is the only open, multivendor, multilayer, and multidomain solution, and it is "a must" for the service provider who wants to win in the marketplace.

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

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